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Petroleum Mining During the Past Season.

The immense production of 1866, estimated to exceed three million of barrels, is rather a puzzle to croakers, the burden of whose song has ever been, that petroleum would soon play out. The fact that with a less amount of development than any year heretofore, the production, in the sixth year of its age, should more than double the amount of its yield, is well calculated to startle the most practical. If the petroleum pet in the sixth year of its age, hold out as well as this, a first class deluge of oil may be expected by the time it is of age. Save Tidioute, the Stevenson, Bennehoff and portions of the smaller tributaries of Oil Creek, no new territory, or rather new farms, have been developed.

None of the old farms have been developed to any extent in comparison to the number of acres owned by them. Many farms of 500 acres have not, on an average, developed 75 acres of the same. What is considered a thorough development among practical men is a well on each acre. The extent of the present Venango oil field, not including that below Franklin, will not probably exceed thirty square miles. Very few of the farms comprised in the same have been developed to as great an extent as we have named above. The bluff or hill territory of the oil region has not been developed until within the past year. The development has, as yet, save in a few localities, been more of an experimental than practical nature. The experiment, so far as it has gone, proves that the existence of oil on the hills, in as great quantities as in the valleys, is a fixed fact, and that the chances of obtaining good producing wells, of longer duration, and as good quality of oil will be equal to that of the valleys.

This hill development will doubtless be carried on upon a large scale during 1867, and will supply an ample amount of territory for all who have any desire to develop new oil lands.

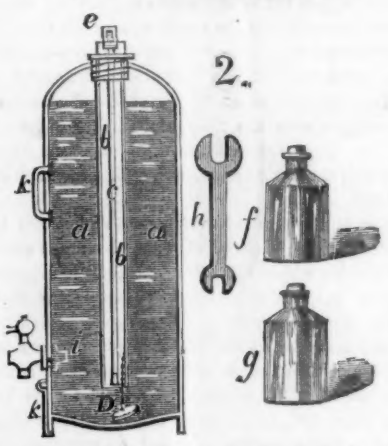
But we contend that no particular necessity exists for new oil territory to develop, for many years to come. By the proper management of the old oil farms such as drilling a limited number of wells, the casing of those already drilled, and the application of more improved machinery, the old farms can be made to supply all the oil that will be wanted. We have no idea that our advice will be heeded. So long as territory undeveloped is within reach, it will possess great attractions to many. The first operators will skim the surface only, while those that follow will reap the harvest.

The low prices that have ruled during a greater portion of the year 1866, will prove really beneficial to operators during 1867. The low prices only serve to introduce petroleum into places and uses, which high prices prevented. Notwithstanding the immense amount of the product shipped to foreign countries during 1866, we have the best of reasons for asserting that the exports for 1867 will greatly exceed it. That the markets of Europe are far from being glutted, we have every reason to believe, while the home consumption is increasing at a prodigious rate. Those of our operators who will persevere, cannot help realizing bountifully.—*Oil City Monitor.*

Extinguisher—Portable Self-Acting Fire Engine.

The engraving represents an apparatus for extinguishing fires. This invention has for its object the extinguishing of fires in a more instantaneous manner than has hitherto been discovered.

Every fire begins on a small scale, and its rapid and



uncontrollable increase is owing to the fact that at the time of its commencement (when every moment's delay in checking it is of the utmost importance) no means are ready at hand.

Fig. 1 shows the Extinguisher ready for use.

Fig. 2 shows a sectional view of the Extinguisher.

To prepare it for use the space *a* is filled with water, the tube *b* is filled with the contents of canister *f*, and the contents of can ister *g* is put into the water *a*. By applying the wrench *h* on the screw *c*, it forces down the rod *c* upon the plug *d*, the contents of the tube *b* fall into the Extinguisher, and the two compounds come together and form the extinguishing liquid, which being a non-supporter of combustion, is of a much more powerful nature than twenty times its equivalent of water. Thus, a No. 2 Extinguisher contains eight gallons of liquid, equal to 160 gallons of a more efficacious material for extinguishing fires than water alone, which will project itself with its own power to a distance of *forty* feet, by the mere turning of the tap, which puts it in full and complete action.

The commingling of the contents of the tube *b* with the contents in the vessel *a*, produces a chemical action and rapidly evolves gases that are largely absorbed by the liquid in the large vessel under the powerful pressure exerted, something on the principle of a soda fountain. Of course the great pressure exerted forces out the fluid through the pipe and nozzle attached to the bottom of the apparatus, as above described, which may be directed upon the flames at the will of the operator, who carries the apparatus upon his shoulders by means of the straps as shown in the small engraviug.

The action of the water or fluid to extinguish the fire is immeasurably increased by the liberation of the gases when it escapes from its confinement in the Extinguisher, because they are like carbonic acid gas nonsupporters of combustion, and fill the space round about the fire to the exclusion of atmospheric air, which would otherwise feed the flames and increase the combustion.

The value of so simple and cheap an apparatus is readily seen. It can be managed by any one and is always ready for action, and by its prompt use may often save property and life that could not otherwise be done. It is asserted that its use would have saved the theatre lately burned on Broadway, and also the Opera House, as both fires were discovered in their incipiency but could not be reached in time to save them by the ordinary method and routine, which our fire departments employ to extinguish fires. An experimental demonstration of this apparatus was made in presence of the heads of the Fire Department and others, January 14th, 1867, and received the approval of the Chief Engineer and Superintendent of Fire Patrol, and several exhibitions have since been made with satisfactory results.

This apparatus is a most valuable auxiliary to safety in any building, and especially when exposed to liability of fire from tar, lard, oil, kerosene, and the like highly inflammable materials, as it seems to quench them by suffocation, when water alone would have but little effect.

Messrs. Levy & Brothers, No. 8 Dey street, N. Y., are licensees of this apparatus, where further information may be obtained.

—At Shoeburyness, England, a short time since, a Palliser bolt af chilled iron, weighing 254 pounds, was fired with a charge of forty-three pounds of powder, from a 9-inch Woolwich rifled gun. The bolt penetrated a target made of solid rolled iron eight inches thick, backed by eighteen inches of teak wood.

—Dr. Balfour Stewart has recently made at the Kew Observatory, England, some determinations of the specific gravity of mercury. At 60° Fah. he found it to be 13.569, as compared with water at the same temperature.

[FROM THE NEW YORK HERALD OF MARCH 15.]

Croton Water.

Its Reckless and Useless Waste—How it Occurs—Facts as to the Consumption of Croton—Will the Supply be Sufficient for the Increase of Population?—Remedial Measures a Necessity—New Works Contemplated by the Croton Board, &c.

"Wilful waste makes woful want" is a household phrase, the truth of which is acknowledged by all nations, and has had the sanction of all ages. Its verity is none the less applicable to those things which nature has provided for us with a bountiful hand, than to those which because of their scarcity become more intrinsically valuable. From its very profuseness there is nothing that is now so recklessly, even sinfully wasted as our Croton water. So great has been the increase of this waste—the consumption of the supply actually doubling every few years—that public attention is being called to the question, whether the present means of supply will be commensurate with the prospective increase of population. It is but a short time ago that the HERALD published in its "Voice of the People" a number of communications bearing on the subject. Some of our correspondents complained that already the head or force of water was not sufficient to keep a supply in the third stories of many of our buildings, especially those situated on the more elevated portions of the island, and the query was strongly put to the Croton Board why this deficit in quantity of the most indispensable of all necessaries was not remedied? To this query there is a ready answer, the truth of which will be acknowledged by all who investigate the subject, viz.:—The water is recklessly, sinfully wasted, and its force and quantity of course lessened in consequence. Persons who have paid attention to the matter assert that two thirds of the daily supply finds its way into the sewers without having previously served any useful purpose whatever. This may be an over-estimate, but if the subject be submitted to critical analysis, the disproportion of the averment will be found not to be so very great after all. When we take into consideration the known causes of waste, the amount of water which is lost appears to be most startling; but if to these we add the ten thousand and one unknown avenues through which the loss of Croton is brought about, the sum becomes so stupendous as to force the inquiry whether immediate steps must not be taken to prevent this reckless use, or rather misuse, if the city is to have security in the future for a sufficiency of God's most beneficent gift to mankind. In order to lay before the public some of the causes which produce the present waste, and to show on what means of supply the consumers have to depend, this article has been prepared.

The Croton lake, or fountain reservoir, covers four hundred acres, and its available capacity is estimated at six hundred millions of gallons. The Croton was introduced into this city in 1842. In 1843, when the capacity of the fountain reservoir had been fully tested by one year's use, Mr. Tower, an engineer employed in the construction of the works, made experiments as to the dependence to be placed on the supply, and came to the conclusion that, in case of a prolonged intense drought in the summer season, subjecting the water to the greatest evaporation, there would be sufficient to furnish one million of inhabitants with twenty gallons per day for the space of thirty consecutive days. This averment, founded on authentic investigation should be enough to put at rest (provided all useless waste were avoided) any fears that might be entertained as to a failure in the supply from any other cause, other than such as afflicted the children of Israel in the time of Elijah, when, as the Scripture narrates, "the heavens were shut up for three years and six months."

The medium flow of water from the lake is fifty millions of gallons in twenty-four hours; and the minimum flow, after a season of drought, is twenty-seven millions The dam or forcing head is thirty-eight feet above what was originally the surface of the natural flow. The surface of the spring head of Croton lake is one hundred and sixty-six and one-sixth feet above the level of mean tide in New York harbor, and the difference of level between that and the surface of the old receiving reservoir (thirty-eight miles distant) is forty-seven and one-sixth feet, leaving the surface of the reservoirs in Central Park one hundred and nineteen feet above the level of mean tide. The surface of the distributing reservoir in Forty second street is one hundred and fifteen feet above the level of mean tide—this last being the height to which the water may generally be made available throughout the city.

In addition to the natural capacity in the lake (six hundred millions of gallons), there is always sufficient water in the reservoirs to meet the actual demands of the city, should the main supply be cut off temporarily for repairs to the dam or for any other necessary cause. In the reservoir in Eighty-sixth street there usually are one hundred and fifty millions of gallons; in the new reservoir in Central Park, one thousand and twenty-nine millions; in the distributing reservoir in Forty-second street, twenty millions.

Besides the reservoirs already erected, the Croton Board has commenced the construction of another one, to be known as the High Service Works, at Carmanaville, which will be used to supply all that portion of the city north of 138th street. Its capacity will be, in exact figures, 10,784,000 gallons, and the average depth of water in it will be sixteen feet. It will be built on the elevated ground on the cliff immediately south of High Bridge, over Harlem river, and will cover seven acres of land. The bottom of this reservoir will be two hundred and six-tenths feet above mean tide, or seventy-two and two-tenths feet above the floor of the acqueduct at the southwestern end of the bridge. It will be of great service, during times of repairs or accidents, especially in supplying that part of the northern district of the city whith lies below the level of our present acqueduct and its reservoirs, and below a plane of two hundred and sixteen and six-tenths feet above high tide. Near to the work and immediately on the edge of the cliff will be built a tower of masonry, which from its base will be about one hundred and seventy feet high. This tower will sustain a stand pipe and an iron tank with a capacity of 47,000 gallons. This quantity is estimated to be ample for supplying, during the necessary stoppage of the pumping engines, all that portion of the upper district which lies above the 216 feet plane before mentioned. The highest point on Manhattan Island is 267 feet above mean tide; the top level of the water in the tower will be 324 feet. These two structures—the reservoir and tower—will be supplied with water drawn from the acqueduct by pumping engines placed under the cliff, and on nearly the same level with the floor of the gate house of the bridge. The estimated cost of the works is $500,000, of which amount $200,000 was appropriated by the act of 1863.

One of the greatest works ever undertaken by the Croton Board is the contemplated storage reservoir, the site for which was selected after a thorough examination had been made by the department in 1857–'58, of the entire valley of the Croton river. This is intended to increase and keep up the supply of water in Croton lake. After much deliberation and an analytical comparison of the advantages offered by the various sites examined, the character of the water in each, and the prospective cost of land and construction, the Department finally selected a plot in the township of Kent, in Putnam county, known as Boyd's Corners, the area of which will be as speedily as possible transformed into a lake. The dam to be erected here will be twenty-four miles above Croton dam, and seventy-one miles from the City Hall. Its elevation will be six hundred feet above mean high tide at the High Bridge, or four hundred and eighty-five feet above the top water level of the receiving reservoirs in Central Park. The work when constructed will be seventy-five feet high from its foundation, and the area of land taken for the reservoir will be about three hundred acres. The capacity of this reservoir will be about three billion, three hundred and sixty-nine million, two hundred and six thousand, eight hundred and fifty-seven gallons The cost of the work will be $200,000. The contracts have already been made, and it is thought that the reservoir will be completed at the close of the year 1868.

To be continued.)

The Process of Roasting Ores.

Translated from the German of F. Plattner, for the MINING & PETROLEUM STANDARD AND AM. GAS-LIGHT JOURNAL, by

J. H. TIEMANN.

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NUMBER XV.

Examples in explanation of the chemical changes which occur when sulphurets are roasted.

Iron Pyrites, Fe S.—This ore, which often constitutes the greater part of many mill products, in which are found subsulphide of iron and copper, sulphides of lead, zinc, etc., when carefully roasted in pulverized form, at a heat which is just sufficient to cause the sulphur and iron to unite with the oxygen of the incoming air, changes first to sulphurous acid and protoxyd of iron; both these products, however, immediately undergo a change. The sulphurous acid changes more or less completely to sulphuric by contact with the protoxyd of iron at the expense of the air, while the protoxyd for the most part changes to magnetic oxyd; in the same proportion as sulphuric acid is formed, it acts on the magnetic oxyd, changing it to sesquioxyd and evolving sulphurous acid, while at the same time the remaining undecomposed protoxyd unites with sulphuric acid forming protosulphate. As this compound is decomposed at a red heat, one half the sulphuric acid yields one atom of oxygen to the protoxyd changing it to sesquioxyd, which with the remaining half of the sulphuric acid forms a persulphate, and sulphurous acid is evolved $2\,(FeO, S\,O^3) = Fe^2\,O^3, SO^3 \times S\,O^2$. If now the temperature is increased, the persulphate (sesquioxyd being a weak base) is gradually changed to free sesquioxyd, the sulphuric acid being set free. If the ascending vaporous sulphuric acid comes in contact with particles of sulphide of iron or magnetic oxyd during the stirring of the charge which has now become woolly in consequence of the generation of gases, and of the change in its aggregated condition, it oxidizes these compounds, changes to sulphurous acid, and either passes off as such, or when it comes in contact with the incandescent ore it is again changed to sulphuric acid, and again exerts an oxidizing influence on the ore. The complete change, therefore, of the iron in combination with the sulphur to sesquioxyd, is not effected directly by the oxygen of the air, but indirectly by the sulphuric acid formed in roasting; this is the reason why sulphide of iron which contains the requisite amount of sulphur for the formation of a large quantity of sulphuric acid, is changed to sesquioxyd in a shorter time and more easily, than a sulphide containing but little sulphur, as for instance the matte obtained in smelting sulphur ores poor in silver, which consist principally of $Fe^2\,S + FeS$ in varying in proportion, provided the temperature is at first very low, and that the gaseous products of combustion are free from reducing gases or carbonaceous particles when they come in contact with the ore.

If the sulphide of iron is in a high state of sulphurization, as bisulphide FeS^2, a part of the sulphur passes off in vapor, which at the surface of the charge where it comes in contact with the air, burns with a blue flame to sulphurous acid. As more warmth is generated than in a simple sulphide, in consequence of the greater amount of sulphur, more sulphuric acid is formed, which acts energetically on the magnetic oxyd, and the small amount of protosulphate formed at the commencement of the operation changes more quickly to persulphate, and this again in a much shorter time to sesquioxyd, than in the roasting of a sulphide with a lower grade of sulphur. When, therefore, it is requisite for any purpose to change a sulphide of iron to a proto or persulphate, it is more advantageous to deprive the pyrities of nearly all the second atom of sulphur by sublimation, so that a compound similar to magnetic pyrities remains, which when crushed and carefully roasted, yields more sulphate of iron than pure pyrities would.

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Important Communication Concerning Gas!

From H. W. FITCH, Secretary of the Gas Company.

A Full and Complete Answer to the General Complaints made against the Company—Interesting Statistics.

OFFICE MEMPHIS GAS LIGHT COMPANY,
MEMPHIS, TENN., Feb., 1867.

Hon. Henry J. Lynn, Chairman Gas Light Committee of the Hon. Board of Aldermen, Memphis, Tenn.:

DEAR SIR: In your letter of the 31st ult.. you write that "numerous complaints have lately been made against the Gas Company. The street lamps burn but dimly at times, in some portions of the city, and many complain of the inferior quality and limited supply of gas furnished them by your company in their stores and private houses"; and you ask us "to furnish the Board of Aldermen with such information as is necessary to explain the causes of these complaints, and what remedy we may have to offer or suggest."

In reply to this portion of your communication we beg to state that there has been at all times many complaints against the company, and were there not, Memphis would, in this respect, be a solitary exception among all the gas lighted cities in the world. It is as common to find complaints against gas and water companies everywhere, as it is to find such companies. It may be safely said that a portion of the people in every community complain against everything that demands the payment of money. Even taxation for municipal, county, State or national purposes, is to them a continual source of complaint. The justness of the demand, the merit of the purpose for which it is made, the impartial character of the levy, or its repeated regularity of imposition, are not sufficient to silence complaint. Whenever money is demanded, there are persons who demur or grumble about its payment. Another peculiarity with this class of persons, as noticeable as that of grumbling, is the fact that they are impressed with the belief that they are in no way addicted or habituated to such a course.

Having carefully observed the movements of the people, and the actions of gas light companies in all the cities of the United States and England, for some years past, we feel assured that an examination of all will show that no city, in either country, of near or about its size, has had less excitement or complaint on the subject of gas light, during the past year, than this city. There has been more than usual complaint everywhere within our observation, arising from a variety of causes peculiar to the especial localities. The only universally acknowledged cause is found in the low price of coal oil, which, while most other articles of common use have advanced in price, has afforded a means of artificial light at less cost than has heretofore been attainable. An increase of complaint in this city may be attributed to the fact that there has been a goodly number of persons pecuniarly interested in making as much complaint against this company as it was possible for them to create. A frequently-repeated or published complaint against this company, was but an advertisement in favor of a proposed new organization. Hence the most trifling pretext gave rise to augmented and magnified representations against the company, and in many instances by persons who were not then, and never had been, its patrons. Yet with all this, the past year has not been as productive of complaints as a like period three or four years ago, and in comparison with then, and the present state of feeling in many other cities. The officers of the company have reason to feel assured that a large majority of their customers appreciate the superior and vastly increased facilities, which, at great expense, have been added during the past year, to the company's means for the manufacture and distribution of gas. An examination of the character and merits of the complaints usually made will prove that most of them, probably nine-tenths of all, arise from causes not traceable to the quality or supply of gas, or for which the company is in any way responsible.

Some localities east of the bayou, in the vicinity of Washington and Poplar streets, have found just reason of complaint, at times, by their supply of gas being partially or entirely cut off. The main supply pipes for these sections cross the bayou on the piers or abutments of the Washington and Poplar street bridges, and those abutments have been subject to frequent changes. The brick work settling carries the pipe down, breaking it off in some instances, and in others sinking it so as to cut off more or less, or perhaps entirely the supply of gas beyond that point. These difficulties, it is hoped, will soon be overcome by the final solidity of the abutments, but if found necessary, after a few months longer of experiment, separate and permanent foundation will be erected by the company for these crossings. A somewhat similar difficulty has presented itself in a number of instances, and in various locatious in the city, known as "made ground"—places originally low or sunken, that have been filled up to the grade by deposits of earth taken from other localities. These places of "made ground" sometimes settle or sink, and of course carry the gas pipe with them, cutting off the supply of gas in proportion as the pipe may be carried below the line of level or its inclination for drainage. The most remarkable instance of this character occurred last fall, at the intersection of Washington and Front streets—an eight inch pipe being carried down over ten inches, of course reducing the supply of gas to the city south of that point, just the capacity of this pipe, or about 25,000 cubic feet per hour.

It may be remarked that the precise location of such defects in the more compactly built portions of the city is difficult to determine, from the fact of the supply pipe or mains being frequently intersected, and thus a light supplied on the line of a direct pipe, and in the immediate vicinity of the stoppage in it, would, after the stoppage occurred, draw a supply from intersections beyond it, the gas flowing back to the point of obstruction. The territory between the gas works and the point of obstruction finds its supply depleted by the flow of gas through intersected pipes to fill up the mains heretofore supplied by the direct pipes; so, of course, the effect is very general—the dimunition of the supply being nearly equalized, the point of obstruction may require much search before it is discovered. This very objectionable feature to much of the territory in which pipes for the supply of this city must be laid, adds more than any other item, coal and labor excepted, to the cost of making and distributing gas light. The sinking of a pipe causes it to leak, and the leakage for this reason is quite unavoidable By way of contrast we may mention the cities of New Orleans and Nashville, in neither of which is there much or any expense on this account. In New Orleans most of the main pipes are water bound or sealed, and in Nashville they being laid mostly in rock, are firm, and never being shaken do not leak. An advantage is also derived at that point known but in few other cities, the gas company being able in the summer or hot weather to sell more gas than they manufacture, while in this city the loss is but augmented by the heat. There the rock bed of the pipes retain heat, and they being heated expand the gas between the place of manufacture and the consumer's meter, in some instances to an extent sufficient to more than offset their loss by condensation and what few leaks they may possibly have.

The quality of the gas supplied by this company for the year past has been uniformly of the very best. Richer, purer, stronger, or more illuminating gas, has not been supplied in any city in this country.

You say "there is complaint as to its quality and quantity, in some stores and private houses." This is very true, and we know of no instance in which the objections have been separated, or in which, had there been sufficient *quantity* at the point of combustion, the superior *quality* would not have been acknowledged. No person capable of reflection will claim for a moment that the gas company makes and supplies "poor gas" to some of its patrons and "good gas" to others. The quality is without perceptible or scarcely a mathematical difference precissly the same at all points of delivery. It is all drawn from a common reservoir, and if, in a single instance in the city, what is termed "good gas" may be seen, it determines beyond dispute the quality of all then manufactured and on hand.

There is, however, a very great difference in the light in different houses, in all portions of the city—on the same streets—of contiguous houses, and, in some instances, different apartments of the same building, supplied by one and the same meter, and in lamp posts perhaps but a few yards apart; some giving good light and others indifferent. This difference is attributable, not to the quality of the gas, for, as demonstrated, it is the same, but *to a difference in the apparatus for its consumption.* Notwithstanding the palpable truthfulness of this proposition, complaints are frequently made to the company that "gas is good in one room of my house and bad in another." "My gas is very bad but my neighbors' next door is good." It is very probable that such complaints are answered by stating that the company supplies the same quality of gas to one that it does to another, and that it is quite impossible for them to have two qualities on hand at the same time—that if the means for its consumption are alike, there will be no difference in the light in different localities on the same level. The quantity manufactured by the company for the past year has been at all times, except five nights at different dates, fully abundant. With the exceptions named (when for the purpose of connecting portions of their newly constructed apparatus, it has been necessary to temporarily suspend the use of a portion of the works, making a short supply that night), they have on hand an average surplus of 50,000 cubic feet per day.

In many houses in the city, the company's regulations in reference to the sizes of pipe for the use of gas, have been wholly disregarded, and many on this account have bad light. This company's rules are the same at those of nearly all the companies in the world, yet builders, contractors and owners have not all learned that there is any importance in having this especial branch properly cared for, and as small pipe cost less than large, the gas fitter naturally uses the smallest he can, as he probably does the whole work for a stipulated price for the job. It is not reported to the company for inspection—the house is finished, the pipe concealed and cannot be changed without great injury to the building. The fitter has been paid and has probably removed, having by this time finished all the "cheap work" he could get. Application is then made for a supply of light; the tenant is refused, on account of defective fittings in the house. The landlord intercedes and promises that no complaints shall ever be made, etc. The gas is furnished, and while the pipe is new and clean, for a year, perhaps, it does very well; but finally begins to corrode on the inside, and being small, soon fills partially, at low points and angles, with scales of rust, and the supply being reduced beyond these points, the consumer, who may be a second or third tenant, knowing nothing of the company's original protest, or of the landlord's promises, (in fact he has probably forgotton them himself!) complains of "bad gas." Upon this question the company has now determined that no exceptions shall be made, and in no instance will gas hereafter be introduced into any premises unless their rules and regulations have been strictly observed.

We may with propriety, also, mention that gas pipe chandeliers, pendants, brackets, etc., like nearly everything, need care and attention. The pipe should be well cleaned out every two or three years, and the chandeliers, etc., taken apart, and thoroughly cleansed. This work is attended to with but trifling expense, and we have never known an instance wherein it has failed to produce most satisfactory results. The use of gas light in this city is of so recent date, that many are ignorant of these facts, and in frequent instances persons are now endeavoring to use fittings and pipe that have been in use without renovation, for ten years or more. A few instances have lately come under our observation in which there had been no attempt at cleaning them in fourteen years. In these cases a skillful gas fitter soon removed *quarts* of rust scales from the pipes, and at once silenced all complaint about "bad gas" in that quarter.

With all gas companies a most fruitful cause of complaint is found in a general forgetfulness of the terms of the contracts between consumers and companies, upon which gas is supplied, and an almost universal ignorance on the subject of gas measurement, and perhaps there is more dissatisfaction everywhere on these points than upon all others combined. A description of a gas meter is not deemed necessary in this connection. The principles upon which they are constructed, with elaborate illustrations and explanations of the mode of operation by which they measure and register the quantity of gas passing them, may be found in so many scientific publications, that it is scarcely possible your committee are uninformed, or do not know that they are universally adopted, and mathematically correct, as a means of determining quantities of gas; and that their correctness is as easily tested or proven as the correctness of Fairbanks' or other scales used for weighing commodities may be determined.

(To be continued.)

The Labor Question.

NEW YORK JOURNEYMEN PLUMBERS PROTECTIVE SOCIETY.

A meeting of the above society was held last evening (12th inst.) at Putnam's Hall, 12th street and 3d avenue, Mr. Thomas Hughes in the chair. The business was for the most part of a routine nature, the only important question discussed being the desirability of gaining from employers fixed daily wages. The matter was fully discuused, but definite action was deferred until a future meeting. The organization has been in existence some four or five weeks, but its member roll comprises already a large number of names, and the utmost unanimity pervails in matters concerning the welfare of the trade.

THE GAS AND STEAM FITTERS OF NEW YORK.

On the 12th inst. a meeting of the members was held at Military Hall, Mr. J. C. Walsh in the chair. On the motion of Mr. Biglio, seconded by Mr. Darrow, it was resolved unanimously that the President be requested to attend the Workingmen's Union as a representative delegate on behalf of the society, and that Mr. Prior, the Secretary, open a correspondence with the sister societies at Chicago and other cities. It appears that the average amount of remuneration at present received by the gas and steam fitters of this city is from $3 to $3.25 per day, but that it is their intention to stipulate for an increased scale of remuneration at a fixed figure of $4.

On the Igniting Point of Petroleum.

By John Attfield, Ph.D., F.C.S.,
Director of the Laboratory of the Pharmaceutical Society of Great Britain.

It is now well known that petroleum, as it issues from the earth, and as met with in commerce in the crude state, emits a vapor of powerful odor, which is inflammable, and which, consequently, when mingled with air in certain proportions, forms an explosive mixture. The combustible properties of this vapor closely resemble those of common coal gas. As with coal gas so with petroleum vapor—a small quantity in a large quantity of air gives odor to the air, but does not form an explosive mixture. Again, coal gas as supplied to the consumer, always contains a small percentage of air, and yet the mixture is not explosive; so petroleum vapor, even though containing a small quantity of air, burns very well at a jet, (so long as the petroleum which supplies the vapor is kept boiling), but the vapor of itself is not explosive. In short, petroleum itself, or petroleum vapor itself, is no more inflammable than common air; it is the mixture of petroleum vapor and air that is dangerous. It is almost as easy to show that a jet of air will burn in an atmosphere of petroleum vapor as it is to show that a jet of petroleum vapor will burn in an atmosphere of air.

Now, crude petroleum generally gives off, at common temperatures, quite enough vapor to form an explosive mixture with air if the air be in a confined space, as in a partially empty lamp, bottle, or cask. For this, among other reasons, crude petroleum is always refined before it is sold to the general public; it is distilled, and the portion which first rises into vapor is collected apart, and, under the name of petroleum spirit, used as a substitute for turpentine. The next and larger portion which distills is the refined petroleum, so extensively sold under various names as a cheap illuminating oil. The residue is heavy oil used for lubricating purposes.

Refined petroleum still has the characteristic odor of petroleum. Even at the coldest temperatures it emits sufficient vapor to be obviously perceptible to the nose, but not sufficient to form with the air in the vicinity of the oil an explosive mixture. But as we rise to the warmth of summer, or of a hot room, or the still higher temperature in the neighborhood of a lighted lamp, a point may be reached at which the oil emits vapor at such a rate that before it can diffuse away into the air of the apartment, explosive proportions are arrived at, and on a flame being brought into contact with the mixture, explosion results. Now this point, the point to which the petroleum must be raised in temperature before its vapor is emitted sufficiently rapidly to form an explosive mixture with the air in the vicinity, will of course vary according to the quality of the petroleum, will vary with the proportion of "spirit" removed by the refiner. If enough has been boiled off, the oil is perfectly safe, but, unfortunately, it is not to the interest of all parties to remove the spirit; hence much of the petroleum sold in retail shops is dangesous to use. Should a lamp fed with it become a little warmer than usual, an explosive mixture forms in the chamber of the lamp, and any flame brought accidentally or thoughtlessly into contact with the mixture, gives rise to an explosion. Hence the legislature of this country has wisely ordered (25 and 26 Vict., cap. 66) that large quantities of crude petroleum shall not be stored within fifty yards of a dwelling house or warehouse except under licence; and the Act states that "Petroleum shall include any product thereof that gives off an inflammable vapor at a temperature of less than one hundred degrees of Fahrenheit's thermometer." That is to say, refined petroleum, such as is commonly vended in retail shops as "Crystal Oil," "Photogen," "American Paraffin Oil," &c. &c., for illuminating purposes, must not be kept in or near a house in larger quantities than forty gallons, unless proof is forthcoming that it does not give off inflammable vapor below 100° F. If it will stand this test, then the liquid is not petroleum within the meaning of the Act, and the owner of it runs no risk. I have purposely characterised this Act as wisely framed, because some have questioned the wisdom of placing restrictions on the sale of petroleum and its products (refined petroleum and petroleum spirit), while naphtha, spirituous liquors, knives, razors and still more dangerous things, are freely bought and sold without any such restriction. It must be remembered, however, that the danger attending the use of these things is well known, and therefore always guarded against, whereas not only was petroleum a new article to the public, the dangers attending the use of which had to be learned, but, worse still, it was introduced as a lamp oil—an article of unknown and dangerous properties was called by the name of an article of known and safe properties. Petroleum, infinite less dangerous in itself, became, by the false colors under which it sailed, far more dangerous than gunpowder—that is to say, there was far greater chance of accidents occurring by it than by gunpowder. I say, that under these circumstances, restrictions on the sale were wisely made, and will be wisely retained until the character of petroleum is thoroughly well recognized.

The Act having been passed, and gone into operation (Oct. 1, 1862), merchants, brokers, and other dealers in large quantities of petroleum, became commendably anxious to buy and sell only that quality of the refined article which should give off no inflammable vapor at temperatures below 100 degress of Fahrenheit's thermometer. But, unfortunately, an egregiously wrong method of determining this point crept into the trade. To ascertain the quality, it was, and still is, usual to pour a little of the liquid into a saucer, small bowl, or other similar vessel, to apply heat by a lamp, by partially immersing the saucer in hot water, or otherwise, stirring the liquid with a thermometer, and applying a lighted match from time to time during the gradual rising of temperature, until the oil caught light. The degree at which this occurred was called the igniting point of the petroleum. But disputes as to the igniting point soon occurred. Careful observers frequently noticed that several degrees before the petroleum finally ignited, a thin blue flame would seem to shoot from the lighted match to the surface of the liquid, or, as one experimentalist expressed it, "the petroleum would seem to ignite and go out again," and some would give this as the igniting point. Other observers, not noticing this flame, or not operating under the circumstances causing it, found the igniting point to be much higher. But igniting points were observed and stated which could not be accounted for by this cause of difference. Hence disputes, and hence arbitrations, which sometimes made the matter worse instead of better. Hence, too, which is the most serious part of the matter, much if not most, of the petroleum sent up to the present time into retail commerce in the refined state for use by the public, gives off inflammable vapor many degrees below 100° F., and is unquestionably very dangerous. Slowly, and apparently carefully warmed in the manner already stated, the petroleum does not fully ignite perhaps till 100° F. is reached, and the inflammable vapor is involved at perhaps 80° or 85°, and should the inflammation of this vapor cause the fracture of a lamp, or otherwise scatter the petroleum, danger to life and property ensues.

The above is only a fair picture of the petroleum trade at the present time. My object in writing this paper is to show why the igniting point of petroleum is liable to variation, and also to suggest a modification of the usual method by which that igniting point shall be determined with accuracy and constancy of results And in speaking of igniting point, I shall henceforward mean the temperature to which the petroleum must be raised before its vapor becomes inflammable. This is point is referred to in the Petroleum Act, and this is the point at which petroleum becomes dangerous. As already indicated, the igniting point of petroleum itself may be several, and often many (sometimes thirty or forty) degrees higher than the igniting point of the inflammable mixture of vapor and air on its surface, and the petroleum does not catch fire for the same reason doubtless, that gun-cotton may be ignited on a heap of gunpowder without setting fire to the latter; the heat evolved is intense enough, but the explosion occurs too quickly for the subjacent material to be ignited. Neither the petroleum nor the gunpowder, however, is any the less dangerous on that account; for, should the ignition of the mixture of petroleum vapor and air cause an explosion so slight as only to force up a little of the petroleum into fine splash or spray, ignition of the petroleum will inevitably ensue, as in that condition petroleum is inflammable even at very cold temperatures.

(To be continued.)

Cast Steel Works of Fried, Krupp, Essen, Rhenish Prussia.

The following particulars in regard to the capacity of the works will probably be interesting to our patrons. In 1865 there were employed:

400 furnaces for melting, heating and puddling.
160 steam engines of 5,863 horse power.
42 steam hammers, from fifty tons down.
110 forge chimneys.
586 machine tools, lathes, planers, etc.
8,187 workmen (also about 2,000 at the mines.)

There was consumed per day:

Of coal.....over 1,000 tons.
" water.....200,000 cubic feet.
" gas (8,000 burners).....280,000 cubic feet.

The plant covers 450 acres, of which over 50 are under roof. There are within the works 12 miles of railway track, upon which 4 locomotives and over 100 cars are employed in the conveyance of material.

The dimensions of the centre shop are 250 by 72 by 90 feet high. This shop is furnished with a crane capable of lifting 80 tons. The large finishing shop represents, with its contents, $700,000 (gold).

There is in course of erection a 125 ton steam hammer; depth of foundation, 90 feet; weight of bed plate, 500 tons; estimated cost with appurtenances, $875,000 (gold).

Krupp's patent cast steel railway tyres, now in use on many railroads in the United States, are extolled for their excellence.

H. G. Brooks, Esq., Superintendent of Motive Power and Machinery, Erie Railway, writes under date New York, June 14th, 1866:

"We have now nearly 600 Krupp tyres in service, and they are giving the best of satisfaction. To my mind the economy over any kind of wrought iron tyre is a fixed fact; for our everyday experience abundantly confirms the truth of my first impressions in regard to them, and my greatest wonder is, that all railroad companies do not take the trouble to investigate the matter."

Water Works for London.

The Southwark and Vauxhall water works for London, are distinguished by some peculiarities which may be of interest, and of which we find an account in *Engineering*, page 377. The water from the Thames at Hampton, is admitted into a subsiding reservoir having an average capacity of five million gallons, from which it is pumped by direct-action engines, thirteen miles to Battersea, where it first accumulates in two subsiding reservoirs, from which it passes through filter beds, and is then pumped into the distributing mains.

The engines at Hampton pump into a thirty six inch main against a head of one hundred and thirty-five feet, in a stand-pipe, by which the flow through the thirteen miles is maintained. The filter beds at Battersea are five in number, and have an aggregate area of nine acres. The water enters each of these at the centre, and is collected from a system of branch-drains built of brick with open joints. The capacity of the filter is found to depend very directly upon the extent of these drains, their effect being limited to a narrow lateral area, so that outward flanging-banks add to the cubic capacity but not to the filtering power of these basins. The beds of the filters are lined with concrete, one foot thick; on this is placed the filtering material as follows: Twelve inches of boulders, six inches of coarse gravel, six inches of fine gravel, six inches of hoggin, and then three feet of Hardwich sand. A head of water averaging four feet is kept upon these. The sand is from time to time washed in an iron cylinder with a perforated bottom, through which the water rises from below. During the month of July, the average daily supply of water thus treated was twelve million one hundred and eighty gallons. Five pumping engines are used at Battersea, to supply the high level service.—*Journal of Franklin Institute.*

—The quality of wool is determined by the number of spirals. The best has about thirty "crinkles" in an nch.

— Zante currants, better than the imported, are raised in Santa Clara county, California.

On the Combustion of Gas for Economic Purposes.

A Lecture delivered before the British Association of Gas Managers.

By Dr. Letheby.

(From the London Chemical News, No. 341.)

(Reprinted at Philadelphia in the Journal of the Franklin Institute.)

[Concluded.]

In the gas engines of Lenoir it has been found that the best proportions of air and gas are eight volumes of air to one of common gas; theoretically the best proportion for London (13-candle) gas is 5.6 volumes of air to 1 of gas. A larger proportion of air is required for cannel gas, as 11 to 1; but in practice it is found that cannel gas does not produce so good an effect as common gas. The time of the explosion is about the 27th part of a second, and the temperature of it is about 2474° Fahr. instead of from 5228° to 7000°, the calculated temperature for open and closed chambers.

The machines which are used for practically employing this power are all modifications of the original engine of Lenoir. They consist of a cylinder with a double-action piston, receiving the mixed gas alternately on either side of the piston. The arrangement is such that, in the movement of the piston, the air and gas, in proper proportions (8 to 1), are drawn into the cylinder by a suitable side valve, and when the piston has made half a stroke it shuts off the valve; at that moment the mixed gas is fired off in the cylinder by means of an electric spark from a Ruhmkorff's coil passing between the points of two wires in the cylinder. One of these wires is insulatad by traversing a rod of porcelain fixed in the cylinder, and, being in connection with a make-and break contrivance called a distributor, attached to the fly-wheel of the engine, it receives the charge of electricity, and so fires the mixed gas at the right moment. The expansion caused by the explosion and heat of combustion drives the piston through the rest of the stroke, and it generally ends with a good deal of unutilized pressure. In one case I find that the indicator recorded an initial pressure of 75 lbs. on the inch at the moment of explosion, and a final pressure of 25 lbs. The loss of power in this case must have been considerable, for not only is there the loss of the difference (12.5 lbs.) between the calculated pressure, 37.5 lbs. (75 ÷ 2), and the real (25), but there is also the total loss of the unavailable final pressure. A part of this loss is no doubt due to leakage, and to the cooling effect of the walls of the cylinder; for the temperature has been observed to fall from 2474° Fahr., at the moment of explosion, to 1438° at the end of the stroke, the calculated temperature being 2156°. Indeed, the management of the temperature is one of the difficulties of the engine, for the cylinder has to be cooled by a stream of water. Improvements will no doubt be made in the construction of the engines, and especially in the utilization of the residual power, and this must be done by shutting off the valve and firing the gas earlier in the stroke. This has already been done to some extent in America with engines of half horse power, as with cylinders of 4½-inch diameter by 8½-stroke, and then with 185 revolutions, or 370 explosions in a minute, raises 16,280 lbs. 1 foot high in a minute. In France and in this country much larger engines are made, as from 1 to 3 horse power.

The quantity of gas used in the working of the engine is rather variable. In the American engine, already alluded to, it took 105 cubic feet of gas an hour to work an engine of half horse power, and a one-horse engine in London takes about 185 cubic feet of London gas—say it is 200 cubic feet—per horse power. This is 1,980,000 lbs. a foot high; whereas the theoretical power of 200 feet is more than 100,000,000 of lbs.

The advantages of the engine are very great; for it takes up but little room, it is very clean, it works with great regularity, it requires little or no attention, and it costs nothing for fuel when it is not at work.

One thing I ought to mention in speaking of the explosive power of mixed gas, and that is the effect of using mixtures in improper proportions. Sir Humphrey Davy found, in his experiments with marsh gas, that there was but one proportion of air and gas which gave the maximum effect, and that was a mixture of 1 of gas and 7.5 of air (theoretically it should be 1 to 9.5). When the proportions are reduced in either direction the mixture becomes less and less explosive, until with 1 gas and 15 air, or with equal volumes of gas and air, the mixture ceases to explode.

In the case of coal gas, although the theoretical proportions for London gas are 1 of common gas* to 5.6 of air, and 1 of cannel gas to 7.4 of air, yet the best results are obtained with 1 of the former to 8 of air, and 1 of the latter to 11. On either side of this proportion the mixture rapidly becomes less and less explosive.

The effect of mixing other gases with explosive mixtures has been well studied by Davy and others. Taking for example, an explosive mixture of 2 volumes of hydrogen and 1 of oxygen, it is found that 1 of nitrogen to 6 of the gas, or 1 of carbonic acid to 7 of it, will stop its explosion.

Lastly, the temperature at which these gases are fixed is a matter of considerable importance. Davy found that he could not set fire to marsh gas (the fire-damp), or to an explosive mixture of it with air, by using the strongest heat of glowing charcoal. He even blew a mixture of the gas upon glowing charcoal until he got it at a maximum heat, without firing it; nor can it be fired by the sparks from flint and steel. Not so, however, with hydrogen, or olefiant gas, or carbonic oxide, all of which are fired by the sparks and by glowing charcoal—perhaps the igniting temperature is about 3900° Fahr., and the vapor of bisulphide of carbon is fired at as low a temperature as 300° Fah. These facts are deserving of attention, for they show that gas leaking from the main may be fired by a spark from a pick, or from the chipping of a hole in the pipe in laying a service.

And now, gentlemen, we have gone over the question of the phenomena of gaseous combustion, and of the manner in which gas is to be most profitably and most economically used for illuminating purposes. We have also examined the thermometic powers of coal gas, and I hope if I have an opportunity of meeting you again I shall be able to bring under your notice another question of interest to gas engineers, and that is the profitable utilization of the waste products of gas works.

Note—

* *Average Composition of London Gas by volume.*

	Common Gas.	Cannel Gas.
Hydrogen	46.0	27.7
Light carburetted hydrogen	30.5	50.0
Olefiant, etc.	3.8	13.0
Carbonic oxide	7.5	6.8
Carbonic acid	0.7	0.1
Aqueous vapor	2.0	2.0
Nitrogen	0.5	0.4
	100.0	100.0

Explosion of Gas in the Washington City Post-Office.

The City Post-office here is supplied with gas manufactured from a gasometer on the premises. This morning (April 12), between 5 and 6 o'clock there appearing some obstruction in the machinery, James A. Kennedy, the Treasurer and Superintendent, accompanied by H. H. Doubleday, formerly of Binghamton, N. Y., and L. B. Moses, clerks in the office, went into the basement room where the gasometer is located to inquire into the cause of difficulty. They carried a light with them, and as the flame came in contact with the unconfined gas an explosion occurred. These gentlemen were at once enveloped by flames. Mr. Kennedy, as soon as he could recover his presence of mind, ran for assistance, while Mr. Doubleday, although his own clothes were on fire, remained to assist in suppressing the flames of the burning clothing of his companion, Mr. Moses. The last named is badly, perhaps mortally, injured. The others, though burnt in the face and hands, are not, it is believed, internally affected. The explosion was like that of gunpowder. It jarred a fourteen inch wall, thirty or more feet from the gasometer, to such an extent as to detach the plastering, and blew open a locked door, splintering the wood. The unconfined gas only exploded; that in the gasometer remains.—*N. Y. Times.*

Mining Share Market.

The San Francisco Weekly Stock Circular of March 16, gives the market rates of mining stock as follows:

Since our last reference, the stock market has manifested more than usual buoyancy, large sales of leading shares having transpired Late information from the mines is of an encouraging nature, and the present state of the weather will probably so improve the roads as to allow work to proceed uninterruptedly.

At a meeting of the Crown Point Company, held on the 11th instant, $75,000 were subscribed to the Sutro Tunnel. This subscription as well as those heretofore enumerated, is contingent upon the full amount of stock—$3,000,000 in currency—being taken. The Chamber of Commerce and the Mechanics' Institute of this city, are also moving in this matter, and have appointed committees to take action in regard to this enterprise.

Hale & Norcross—No sales transpired during the past week: it is nominally quoted at $3,000 per foot. During the month of February this company had 2,628⅓ tons of ore reduced, which yielded $108,215 92, showing an average of $41 16 per ton. They have also reduced 39½ tons of first-class ore, yielding $9,423 52. On the 4th inst., the new shaft had attained a depth of 145 feet. A dividend of $125 per foot was disbursed to the stockholders yesterday.

Savage—has been well maintained, opening at $1,920, advancing to $1,940, then selling at $1,900@1,910 and closing yesterday at $1,850. During the week ending March 9th, little work was done in the mine—only 213 tons of ore were extracted, showing an assay value of $54 56 per ton. We learn that a very material improvement is noticeable in the quality of ore taken from the south winze, at a depth of 110 feet below the second station from the Curtis shaft.

Crown Point—has met with little inquiry, selling early in the week at $890@880, improving to $900@912 50, and closing at $850, ex-dividend.

Yellow Jacket—has been largely dealt in at an advance from closing quotations of last week, steadily improving from $755 to $832 50, and selling yesterday at $830.

Gould & Curry—declined from $475 to $460, and at the close $460 is asked.

Chollar-Potosi—continues to be in demand, nearly 800 shares changing hands within the past week, selling at $252, rising to $259@260, falling to $249@245, and closing yesterday at $248.

Ophir—advanced from $224 to $240, dropped to $230, rallied to $237@238, and at the close sold at $233.

Imperial—continues in request at improved rates, advancing from $107 50 to $220, and closing yesterday at $218. This company disburses a dividend of $15 per share to-day.

Expire—sold at $182 50@185, closing at $170, ex-dividend....Belcher sold within a range of $115@122 50, closing at $107....Bullion at $13 50@26, assessment unpaid....Confidence at $11, then at $35@37, assessment of $25 per share delinquent. The bullion returns of this company during the month of February amounted to $11,398 74.

California Copper Mines.—The working of copper mines in California has now attained such a development that it promises even to surpass in importance those of mercury, and justifies the prediction that it will one day become the largest copper-producing country in the whole world. The California copper mines are rich and numerous. Ores containing 2 per cent. can be profitably smelted, it is believed, at Swansea. The California mines give easily 10 per cent., and have already produced thousands of tons giving 20 per cent. Enormous profits might be realized if the price of transport to San Francisco from the mines of Tulare, Siskiyou, Plumas and San Bernardino, permitted the exportation of the ore. Fifteen counties, from San Diego to Del Norte, possess veins of copper which will give at least 10 per cent., but while the means of transport remain so costly, only the mines nearest to San Francisco can be profitable at the present time. Among these the Union mine, at Copperopolis, exported 110 tons of ore per day, of which 50 tons contained 20 per cent. of metal; but a very large portion of this is absorbed in the cost of carriage of the ore to San Francisco. To obviate this cost attempts have been made for some time past to smelt the ore on the spot. The German system of smelting is generally employed in California. By this means cakes containing from 90 to 95 per cent. are obtained. It will soon be found as common as bars of gold or silver in the market of San Francisco. The ores found at present are carbonates and oxides.—*Jour. Applied Chemistry.*

Drying Peat.

Frequent inquiry is made as to the practicability of drying peat by artificial means, and the best method of accomplishing it. That it *can* be dried by artificial means has been satisfactorily demonstrated; but we are by no means prepared to say, that the *best* and most economical method for accomplishing it has yet been devised. A great variety of kilns are in operation, some of them certified and acknowledged to work almost to perfection in drying lumber, cotton, tobacco, etc.; but wet peat is obstinate, will not yield kindly to the same treatment—in fact is "a poser." Its peculiarities have yet to be fully understood.

The method of drying pursued at the Horwich Works in England, and which is said to be successful, though not economical, is described as follows:

"The wet blocks of peat are delivered on a band or apron, which conveys them into the drying chamber, through which they travel forwards and backwards on a series of endless bands at a fixed rate of speed, exposed all the time to the action of a current of heated air. The travelling bands are so arranged that the blocks of peat are delivered from one to the other consecutively, and are, by the same movement, turned over in order to expose fresh surfaces, at regular intervals, to the action of the drying currents; so that they emerge from the chamber dry, hard and dense.

"The next stage in the process is the treatment of the peat in close ovens, when it may either be converted into charcoal for smelting purposes, or may be only partially charred for use, as fuel for generating steam, or in the puddling surface."

The *principle* described is the correct one.

The points to be considered in perfecting a process for artificial drying, aside from the first cost of buildings and apparatus, are the time required, the expense for fuel and labor, and the quality and characteristicc of the fuel produced, as affected by the manner of drying. We have no idea that artificial drying will be resorted to, to any extent, during good weather in the summer, at present; for Nature accomplishes the work for us, when she does it at all, better than Art can, and at much less expense, for sunshine and wind cost nothing; but in stormy weather, and during the winter season, we are satisfied that it *can* be done; and although the best method has not yet been proved, we are on the direct road to it, and by patient, persevering effort, with a willingness to "make haste slowly," we fully expect to reach it in good time.

A light current of heated air, passing over and through the mass of peat is what is required; the details of buildings, mechanical arrangement of the apparatus, and cost of fuel and labor, by which to attain the best results in the most rapid and economical manner, are points which cannot be said to have been sufficiently elucidated to admit of writing definitely in regard to them.

Steady progress is being made, and time, skill and enterprise are sure to demonstrate the *best* method of artificial drying. We can now, in good weather, by the improvements in our own process, manufacture and deliver a good fuel for locomotive service *in four days from the bog.—Leavitt's Peat Journal.*

PATENT CLAIMS.

Pertaining to Gas, Mining, Petroleum, Water etc.

FOR THE TWO WEEKS ENDING APRIL 16, 1867.

63,376.—Illuminating Burning Fluid.—Lorenzo D. Ferguson, Corning, N. Y.

I claim a carbonized benzine fluid for illuminating purposes, compounded of the ingredients or equivalent in the proportions, substantially as described.

63,400.—Petroleum Stove.—Joel Lee Galesburgh, Ill.

I claim, First—Packing the conducting tube with wood in the manner and for the purpose set forth.

Second—A gas generator made of a coiled tube to encircle the jet of gas, the lower point being turned so as to allow the gas to flow through the centre of the circle and burn against the bottom of the cooking vessel substantially as set forth.

63,416.—Gas Engine.—Francisque Million, Paris, France.

I claim, First—The combination of the cylinder, C the pump, A and B, the branch receiving pipes, a and b, the mixer, F, in such a manner that the air and gas to supply the engine shall be forced simultaneously through the mixer to supply the cylinder by the simultaneous action of the two pumps, A and B, as set forth.

Second—The combination of the mixer, F, represented in figs. 4 and 5, composed of a folded plate of metal as described, with the branch pipes, a' and b', so constructed and arranged in combination with each other and the main pipes as to deliver the gas in the latter, in their alternate layers, as described.

Third—The combination of the parts represented in fig. 7, or their equivalent, with the cut off rod, in such a manner that the closing of the current shall be effected simultaneously with the closing of the cut-off valve, substantially as and for the purpose set forth.

Fourth—The combination with a gas-burning engine of a porous substance, B, placed in the receiving pipe, as represented in fig. 8, substantially as and to the effect set forth.

63,418.—Water Tank for Railroads.—John Morton, Winchester, Indiana.

First—In combination with the tank, A, and stationary pipe, D, arranged to operate substantially as and for the purpose set forth.

Second—The combination of the pipe, B, adjustable connecting pipe, D, and adjustable hinge, E, substantially as set forth.

Third—The combination of the horizontally adjustable pipe, D, and the ropes and weights, H, and swivel pulley, I, substantially as described and for the purpose set forth.

Fourth—The combination of the cord, C2, bell crank, C1, and valve, C, with its stem and weights, G, substantially as set forth.

63,431.—Steam Generator.—Stephen P. Ruggles, Boston, Mass.

I claim arranging a steam chamber or generator at or near the bottom of a closed steam boiler, as and for the purpose substantially as herein described.

63,469.—Steam Generator.—Charles E. Case, Xenia, Ohio.

First—I claim the application to the exterior of steam generators of a coating composed of asbestos mixed with fire clay and held in place by a metal covering, as herein shown and described.

Second—In combination with a generator, constructed as herein described, I claim the coiled pipe, B, terminating in the perforated nozzle, C, all arranged to operate as set forth.

63,490.—Hot-Air Furnace.—H. A. Engels, C. H. Engels, and John Wieland, San Francisco Cal.

We claim the arrrngement of the set of pipes, c i p l q, bolted and cemented together, and at the same time staying the side plates the sections and the whole structure of the furnace by means of the grooved shoulders and flanges of said pipes, as shown in figs. 5 and 6, in combination with the squaae tubes or drying chamber, r s, substantially in the manner, for the purpose, and upon the principle as herein set forth.

63,511.—Apparatus for Carburetting Gas and Air.—Durell Hall, New York City.

First—I claim the coiled condensing pipe, I. used in the gas chamber of the vessel A, and provided with a check valve when used in combination with the receiving tanks, K, as and for the purpose specified.

Second—The arrangement of the heater, C provided with pipes, D and E, with the vessels, A and B, the branching air pipe, G, and the supply pipe, F, as and for the purpose specified.

Third—The arraugement of the receiving tank, K, provided with pipes, D and E, with the vessels, A and B, the branching air pipe, G, and the supply pipe, F, as and for the purpose specified.

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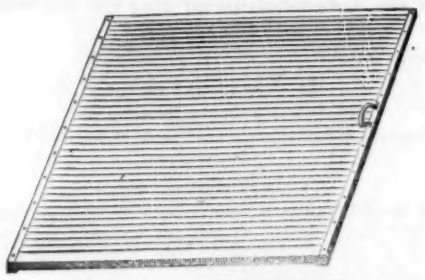

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PROPOSALS FOR THE CONSTRUCTION OF THE SUMMIT DIVISION OF THE ILLINOIS AND MICHIGAN CANAL.

Office of the Board of Public Works,
Chicago, March 18th, 1867.

Sealed Proposals will be received by the Board of Public Works at their office, until 11 A. M. Wednesday, May 1st, 1867, for the excavation necessary to deepen the Illinois and Michigan Canal, according to the plan adopted, from Chicago River to Summit Lock, No. (2) two, a distance of twenty-six (26) miles.

Maps, profiles, specifications, etc., will be exhibited at the office of the Board of Public Works in Chicago, on and after April 15th until the day of letting.

There will be some two millions (2,000,000) cubic yards of earth excavation—some of it quite hard and embracing considerable detached rock—and about four hundred seventy thousand (470,000) cubic yards of stratified limestone.

The work must be prosecuted so as not to interfere with the use of the Canal during the season of navigation.

It is believed, however, that the most of the excavation, except the stratified rock, can be done with steam dredges without interfering with the navigation of the Canal, but the rock excavation will all have to be done between the close of navigation in the fall and the opening in the spring.

If a new line be adopted for any portion of the distance, operations thereon may be continued the whole year; and the navigation of the Canal will be suspended at least five months in each year, unless otherwise mutually agreed by the Board and Contractors.

The whole of the work must be done on or before the end of the third season of the suspension of navigation.

A large amount of machinery will be required to excavate the work within the time required, consisting mainly of steam dredges, scows and cranes for the earth work, and drilling machines, pumping machinery and cranes for the rock.

Contractors will be required to commence work on the earth excavation within thirty days of the time of letting, and upon rock excavation by the 1st of November next.

The dredges, cranes and scows now in the Canal can be had at an appraised value, which will be made known to bidders prior to the letting.

Parties contracting for the work will be required to provide all machinery, and to put up and remove all dams and all works of protection, and at their own expense to do all pumping, or whatever may be necessary to secure their work from water.

Proposals must be addressed to the Board of Public Works, endorsed "Proposals for Deepening Illinois and Michigan Canal," and be accompanied with the usual two hundred dollar ($200) bond, with sureties, to be approved by the Board.

Contractors will bid, stating the price for which the work will be done on each of the different sections, and the work will be let as a whole or in part, and in such quantities as the Board shall determine.

The Board reserve the right to reject any and all bids, and no proposal will be accepted unless the party offering it shall give evidence satisfactory to the Board that he has the necessary skill, experience, energy and ability for doing the work, is trustworthy, and has sufficient pecuniary resources.

The Board will require such security as, according to their judgment, will secure the doing of the work according to the contract.

J. G. GINDELE,
FRED. LETZ,
O. J. ROSE,
WILLIAM GOODING,
R. M. MASON,
Board of Public Works.

75-8t

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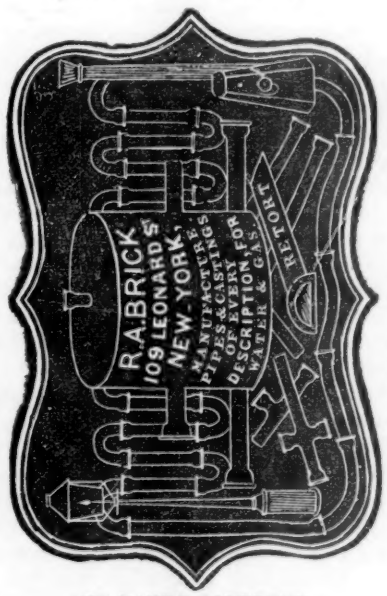

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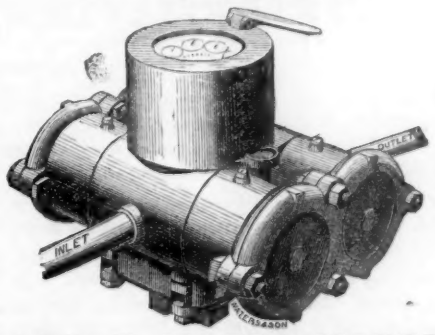

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ACCURACY, SIMPLICITY, and REMARKABLE DURABILITY with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our largest cities.

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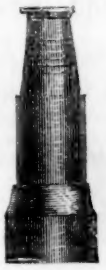
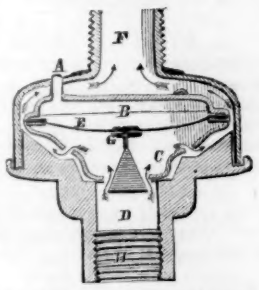
NOTICE

To Gas Companies and Gas Consumers.

THOMPSON'S GAS CONTROLLER.





The only perfect SELF-ACTING REGULATOR and burner combined ever invented or known to science.

This Automatic Gas Controller works upon a simple and well-known principle in Mechanics. The lower cut fully shows its construction. The conical valve at G is attached to the elastic diaphragm, E. As the gas enters in the direction as shown by the arrows, the diaphragm E is acted upon according to the pressure of the gas, and tends to close the valve upon its seat. The chamber, B, of the inner case communicates with the air by the orifice, (A). Hence the gas below the diaphragm is only balanced by the air above it and the valve falls or rises as the pressure varies, to regulate the admission of the gas, and consequently the pressure at the burner.

This Controller will save from 25 to 60 per cent. of gas according to the pressure in the mains, and gives a beautiful, steady light, at a minimum of cost.

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J. H. Adam, Esq., " New York Gas Co., "
Peter Cooper, Esq, Cooper Institute, "
John A. Duff, Esq., Olympic Theater, "
Geo. H. Kitchen, Inspector of Gas Meters, "
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AMERICAN GAS-LIGHT JOURNAL,

Published on the 2d and 16th of Each Month

At No. 22 Pine Street, New York.

BRYANT, CALLENDER & CO.,

EDITORS AND PROPRIETORS.

Profs. Partz & Buck, Consulting Chemists.

TUESDAY, APRIL 16, 1867.

Wishing to make this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting checks or post office money orders, as we are frequent losers where money is enclosed in letters.

☞ News Agency.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. Newsdealers will please send orders to them.

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Answers to Correspondents.

"H. C." N. Y.—We have not the London Exchange from which the article regarding "Iron Cement" was taken.

"L. V." Texas.—The steam and water in a boiler are always at the same temperature under any pressure. The temperature of the steam and water will be 305° Fahr., at a pressure of 60 lbs. on the square inch.

"Sap," N. Y.—Sheet-iron pans can be cheaply made, and will answer admirably to evaporate maple sap. The boiling down or granulation will require a kettle to operate to advantage.

"J. B. L." Ill.—You cannot interpose any substance between a magnet and a piece of iron to neutralize the attraction, unless it be the pole of a stronger magnet. A sudden blow, or heating to redness, will destroy the magnetic properties of a permanent magnet.

"S. F." Vt.—It will be necessary to use a force pump to raise water to any point above 33 feet. The water-ram employs the momentum of a large body of water to raise a smaller quantity to a higher point, and of course there will be a great waste of water on the account.

"N. A." Va.—The yellow particles in the specimens you sent us is mica, quite valueless in that condition.

Gas Explosion.—On the 10th of March a serious explosion occurred in the Manchester Corporation Gas Works Rochdale road. The gas was being removed from one purifier to another, in order that they might be alternately cleaned, when a very large volume of gas escaped, and, filling the purifying-house, ignited at some exposed fire, and a tremendous explosion took place. Seven men, who were at work on the premises at the time, were seriously injured, three of them severely. The building was greatly damaged, the roof, which was slate, being blown off; the doors of the engine house being shattered into fragments. Hundreds of windows in the neighborhood were broken.—*London Exchange.*

The Gas Question and the "Herald."

The "*Herald*" not long ago advocated the making of illuminating gas in the coal regions of Pennsylvania, some 300 miles away, to be conducted in immense pipes "over hill and dale," up mountains and across rivers, to supply the various seaboard cities in prrticular and the interior towns and cities in general, whereby we were to have gas for a song, and the present gas companies were to be reduced to the necessity to make gas and present it to their customers gratis or to close up business and leave the field to the trans-mountain, mammoth, universal gas manufacturing and distributing company.

We did intend to make a practical estimate of this enterprise, so capitalists might have some idea of the cost of the undertaking, and the probability of its being a paying investment. But time is too valuable to us to waste in estimating in detail the cost of shch a fallacious and impracticable scheme.

The tubing alone of the main branch would cost about $200,000 per mile, or about $30,000,000 for the entire route of 300 miles to reach this city alone, saying nothing about the branch pipes after it reached the city. It would require the works at the coal mines to be of a magnitude to make as much gas as the present works in New York, Philadelphia and Boston combined, running a week in advance to fill the main tube, and it would require gas-holders equal in size to to the buildings of the Paris Exposition to contain it. Immense pumping engines would be required every twenty miles to overcome its natural levity or buoyancy and friction and force it on its way, and when it reached the city about 10 per cent. of illuminating gas would be left, the nine-tenths having escaped into the open air, while its place in the pipes would be occupied by as much atmospheric air from the operation of the peculiar property of exosmose and endosmose which all gases have when separated by such pervious media as iron tubing.

After getting the franchise and right of way for the laying of pipes by the expensive "pipe laying" usually necessary, it may be well to estimate the magnitude and cost of the gas works—the cost of transportation of all the materials to build them—the cost of building a city for the army of gas men and coal men and their families, and the cost of supporting them in that distant and inhospitable region. After all is estimated, where is the gain? "Why the coal will only cost its price at the mine, and the cost of transportation will be saved," says the projector. That is, the coal converted into gas and transported as gas is to cost nothing for transportation!

Now it is well known that the coke and coal tar derived from the process of distilling coals for gas making is sold here at the works at a price sufficient to pay for the transportation of the coal. Then where is the gain in the *Herald's* project? The coke at the mines would be a drug. It would be too bulky and liable to waste to transport to market, and would actually have to be carted out of the way at an expense.

Magnesium Light.—The same journal has frequently called the attention of the expectant public to this light as a probable substitute for gas; but it finally admits that the metal magnesium at $7 per ounce can hardly be expected to answer the purpose. It is quite probable that some cheap method will be devised, sooner or later, to extract magnesium from its combinations, where it is now locked up in such immense quantities.

There is no doubt the magnesium light is useful at present cost, to a limited extent, especially for photographic purposees, and can be employed to advantage to temporarily illuminate subterranean and subaqueous places, so as to obtain photographic views of them. Excellent views of the Catacombs of Egypt and Paris, and the Mammoth Cave of Kentucky have been obtained in this way, and more recently an operator went down in a diving bell and obtained a photographic view of the bed of the Thames in England.

Electric Light.—Recent experiments in France and England would seem to prove that by an important improvement in magneto-electric apparatus, light may be obtained by this means at much less cost than heretofore, and enthusiastic people are willing to expect a great revolution in the science of artificial lighting,

The daily press has taken up the theme, and some like the *Herald*, are willing to have the public believe that gas lighting is to be done away with, because a factory in England was lighted up by the new light, and "showed something like an expense of one cent per hour."

It is asserted the cost of chemicals and corrosion of metal to produce the electricity in the old way is done away with; but they forget to state that it requires something else quite as expensive, it may prove, when summed up, viz., a steam engine to revolve the immense armatures of the magnets with a velocity and an expenditure of power, it is fair to presume, commensurate with the results obtained. Is it not plainly a convertability of force or power? Light is produced thereby, and it may be true the wear and tear of the machinery may cost only a cent in an hour. Now we want to know the actual *cost* of the *power*.

Igniting Point of Petroleum—Explosive Oils.

Our readers will find on another page an article on the igniting point of Petroleum, by John Attfield, Ph. D., F. C. S., Director of the Laboratory of the Pharmaceutical Society of Great Britain, which treats the subject in a very clear and able manner.

The great number of accidents, wherein life and property are jeopardized and too frequently destroyed, from the incautious use of Petroleum and its congeners, makes this subject one of importance to the public at large, aside from any scientific bearing it may have.

Not a day passes but the report of some accident of more or less note, may be found in our exchanges. We saw it stated not long since that some person of a statistical turn of mind had kept a record for the past year, which had come to his notice, and the number of lives lost by accidents of this nature footed up over two hundred, and the loss of property amounted to over $7,000,000. If this is true, that a partial record as this must have been, obtained by one person through the ordinary newspaper notices, shows such a startling loss of life and property, the real figures, if they could be obtained, would be really appalling.

The public are generally remarkably ignorant about the different qualities of the oils and fluids offered in the market for sale, for illuminating purposes.

Kerosene oil and Petroleum oil, as first prepared and introduced as illuminators were comparatively safe under ordinary circumstances, to be used in lamps, lanterns, and the like.

As the Kerosene or oils distilled from coal gave place to the products of the earth, oils of the Petroleum family, owing to their less cost, dealers and retailers soon discovered that the lighter products of the Petroleum distillates were a drug in market, and could be bought for a few cents a gallon. Actuated by motives of tupidity they commenced mixing the genuine Kerosene and Petroleum oils with the cheap light hydro-carbons or napthas, and selling it as pure Kerosene to their unsuspicious cus-

tomers and not unfrequent victims. After a while distillers themselves failed to remove the volatile or inflammable spirit in many cases, and no two refiners could be found to furnish a uniform grade of oil, because there was no authorized or regular method to test the oils.

The late law regulating the manufacture and sale of illuminating oils will doubtless, in a great measure, prevent the liability to accidents, if it is strictly enforced. But there is likely to be much difficulty in properly enforcing the law as it reads. It will be contested on different grounds—first as to constitutionality, and again as to the various interpretations that may be given to it.

Parties have obtained patents of the United States for various methods of making the volatile oils less explosive or inflammable, and have paid their money to one branch of government to obtain the right to "manufacture, use and vend" said articles. Now another branch of the government steps in and makes those who "shall sell or offer for sale" said articles, liable to fine and imprisonment. The Patent offices grants a privilege in this case which the late amendment of the internal revenue law makes a misdemeanor to exercise. The law reads thus, as approved by the President, March 2d, 1867:

"Sec. 29. *And be it further enacted*, That no person shall mix for sale naphtha and illuminating oils, or shall knowingly sell or keep for sale, or offer for sale such mixture, or shall sell or offer for sale oil made from Petroleum for illuminating purposes, inflammable at a less temperature or fire test than one hundred and ten degrees Fahrenheit; and any person so doing shall be held guilty of a misdemeanor, and on conviction thereof by indictment or presentment in any Court of the United States, having competent jurisdiction, shall be punished by a fine of not less than one hundred dollars nor more than five hundred dollars, and by imprisonment for a term not less than six months or more than three years."

There seems to be a difference of opinion as to the intent and meaning of this act. It is evident the object aimed at and expressed in the first part of the clause, is to prevent the *mixture* of naphtha and illuminating oils, but it is not so well understood, whether unmixed naphtha and other hydro carbons that inflame at less than 110° Fahr. can be sold for illuminating purposes. Many contend they can. We think differently, and believe all who are selling such oils for illuminating purposes (as many now are doing) lay themselves liable to the penalty expressed. When these oils are used in "carburators" or "atmospheric gas machines" and similar contrivances, to carbonize or in enrich gas or atmospheric air, to produce an illuminating gas, the law evidently does not interfere. "Illuminating oils" is the term used to define those oils which are burned in lamps and the like by means of a wick.

Brooklyn Gas Contracts.

There seems to be a contest going on in the Brooklyn Board of Aldermen, regarding the merits and demerits of the "Simon pure" gas as made by the companies for the city use, and the same gas enriched by passing it through a vessel containing naphtha or other volatile hydro-carbon.

The advocates of the carburretting process assert that the appropriation of $325,000 for the street lighting can be reduced by that process so as to save the city $175,000, or about 50 per cent., and the matter has been referred to the Lamp and Gas Committee, in conjunction with the Corporation Counsel and the President of the Board. Whether it is best to increase the carbon of gas at the lamp by aid of a hydro-carbon liquid, or to do it at the gas works by using a richer coal or other carbon; or to employ the same material used at the lamps, is a matter for the parties interested to determine.

That the gas as ordinarily made in Brooklyn or elsewhere can have its candle power increased at the burners, or at any point after entering the service pipes, by charging it with the vapor of a hydrocarbon, there is no doubt. By comparing the difference in the amount of light gained with the cost of the apparatus and material used, any one can gain a pretty accurate idea of the value of the new process. We have no doubt but there are many places where a considerable saving can be obtained by the aid of a carburrator; we consider the street lamps one of those places. We are somewhat familiar with the apparatus proposed to be used in the Brooklyn lamps, and believe it to be the best invention of the kind that has ever come to our notice.

Gas and Gas Consumers.

We have commenced in this number a somewhat lengthy but important article by W. H. Fitch, Esq., Secretary of the Memphis Gas Company, Tennesee, in answer to a general complaint made against said company.

Mr. Fitch treats the subject in a clear, sensible, and logical manner, and shows so conclusively that the cause of dissatisfaction on the part of gas consumers arises mostly from ignorance, prejudice, or antagonistic personal motives. In the majority of cases throughout the country where ill feeling arises between the consumers and the gas company, the same condition of things are to be found, and a similar solution of the difficulty may be had. Hence the perusal of this article will be instructive and beneficial to both gas manufacturers and gas consumers.

"Air in Gas."

Gas men, and the public especially, will be interested by perusing the able article published in our last number, headed "Air in Gas," in the correspondence. The writer has treated the case in a very lucid and convincing manner, which shows him to be fully posted upon the subject.

The data we gave regarding the deterioration of gas by mixing atmospheric air is in accordance with our own experience, but we have the authority also of Dr. Letheby in his instructive lectures "On the Cumbustion of Gas for Economic Purposes," delivered before the British Association of Gas Managers, which we are now publishing, gives us the exact figures in a table published in number 13, present volume of this Journal, page 194.

We shall be glad to hear from "G. R." often.

ERRATA.—In our last issue, in the correspondence headed "Air in Gas," the following mistakes inadvertently occurred.

In the 11th paragraph, 3d line from the bottom, for filling the "power" read "prover."

In the 16th paragraph, 2d line, for "meter power" read "meter prover."

In the 6th line, same paragraph, for "power" read "prover."

In the 17th paragraph, 3d line, for "power pure" read "prover pure."

Gas Engineer's Book of Reference,

Illustrated with numerous engravings, and containing description and prices of all articles required in connection with the system of Gas Illumination, as manufactured and supplied. By Geo. Bower. 4to. paper, $1.00.

GAS FITTER'S GUIDE,

showing the Principles and Practice of Lighting with Coal Gas, with details of Fittings. Paper, 40 cents.

GAS CONSUMER'S GUIDE.

By William Richards. 1 Vol., 50 cents.

For sale by

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Publisher and Importer, 192 Broadway.
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JONES & COLLINS'

AERO GAS HEATER BURNER.

Patented 7th August, 1866.

The utility of the article will be at once apparent. It is used chiefly for Glue Kettles, Hot Water Boilers, Oyster Saloons, the Sick Chamber, or Nursery; for Jewelers, Artists, and Photographers. Its perfect combustion, freedom from soot or smoke, great economy of Gas, and its adaptation to different pressures by its regulating screw, make it a desirable article.

ECONOMY.

In all Wire Gauze and Perforated Heaters, it is necessary to keep a nearly wide open cock, and consequently large consumption of Gas. This burner can be turned down so as to use not more than 1-5th of a foot per hour.

DIRECTIONS FOR USE.

Screw on the Burner as it comes in the package. Light the holes in the dome top. Then, by gradually unscrewing the cylinder from the base, it (the cylinder) is elevated, and the air passages opened, permitting the air to mix with the Gas until the flame becomes quite blue, and combustion perfect.

Burners 2 feet per hour.
" 4 feet per hour.
" 8 feet per hour.

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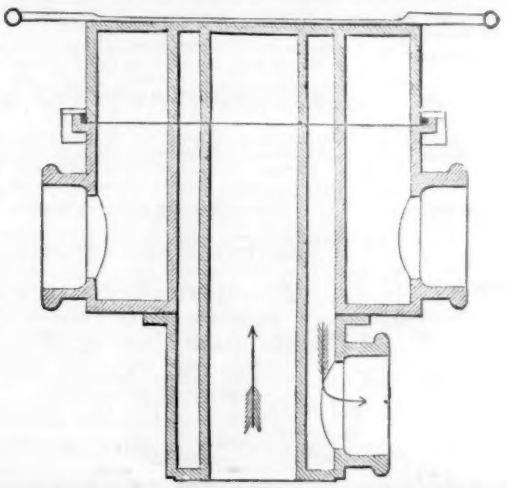

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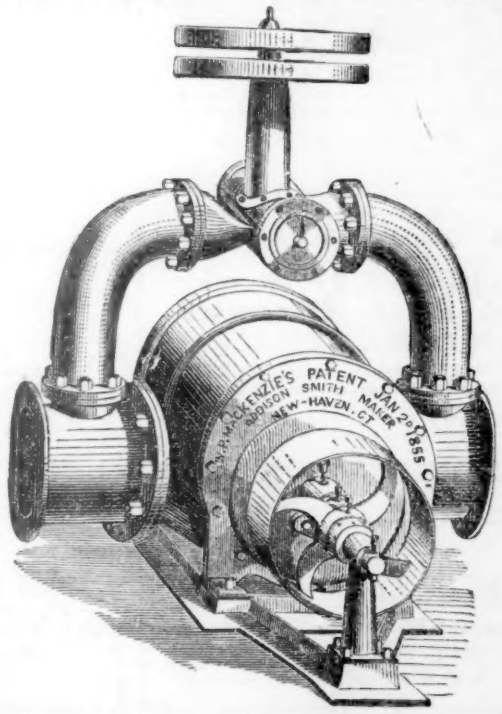

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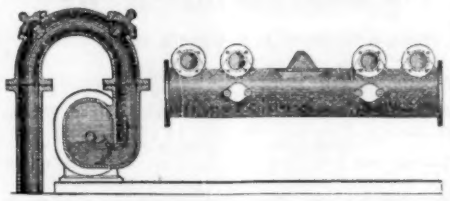

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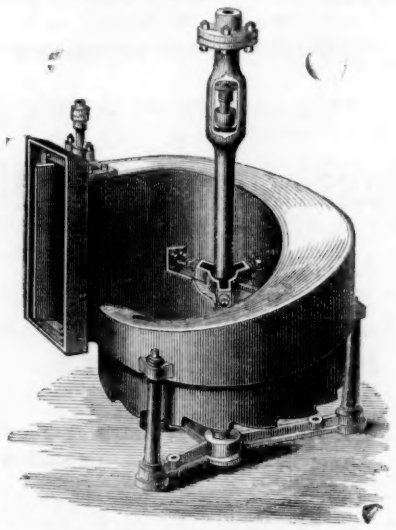
THE VALUABLE IMPROVEMENT FOR SAVING and otherwise improving the gas, invented by Dr. J. S. Wood, described in the "Gas-light Journal" October 2d, 1866, is now for sale by State or County rights.

Address J. S. Wood, Patentee, No. 400 Library Street, Philadelphia, Pa.

STEVENSON'S

Helical Jonval Turbine Water Wheel,



For first-class mills and factories where great economy of wate and simplicity and durability are required.

Manufactured by the Patentee,

J. E. STEVENSON, Hydraulic Engineer,

40 Dey Street, New York,

☞ Stevenson's Jonval Turbine Water Wheel gave the highest per centage of power over all others at the trial of Water Wheels at Fairmount Works, Philadelphia, March 9th, 1860. NINETEEN WHEELS WERE TESTED. The only practical test on record.

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With STEARN'S PATENT SETS, far superior to Rack and Pinion and Screw sets. Years of wear will not cause lost motion. All plank sawed with perfectly even thickness. No time lost in setting. Suitable for sawing any kind of Lumber and Timber.

SUPERIOR MULAY MILLS

With the latest improvements, at reasonable prices.

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Especially adapted to lumbering purposes.

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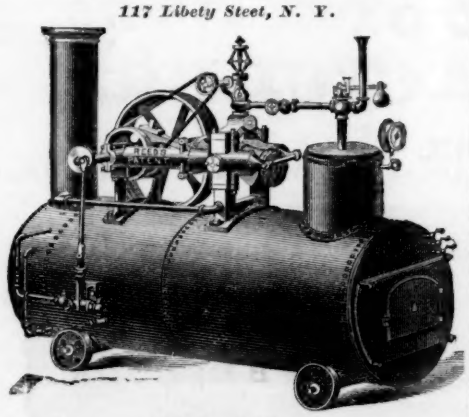

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Kerosene Cooking & Heating

STOVES AND RANGES.

THESE COOKING STOVES WILL

☞ *Bake, Boil, Stew, Fry and Roast,*

With the greatest economy and facility, and without heating the room in which they are used. They are perfectly simple, operating like an ordinary Kerosene Lamp with a chimney, and are the only Kerosene Stoves that burn without smoke or odor.

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Our Heating and Cooking Stoves are very convenient and economical, especially where a fire is required but a few hours at a time.

Orders for Stoves may be sent through American Advertising Agency, 389 Broadway, New York.

ALEX. M LESLEY,

Manufacturers, No. 605 Sixth Ave., New York.

Send for Illustrated Circular. (136

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FOR

Families and Manufactu rer,

☞ *Something New and Invaluable for Family Use.*

We offer the public the simplest, strongest and best Knitting Machine in the world.

It occupies but little space—is portable and can be attached to a stand or table, weighs about 40 lbs.

It will knit a variety of Stitches—the breakage of needles is trifling—the cost of needles is insignificant and the most delicate material can be knit pure and spotless, as the needles are not oiled.

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Send for a Circular—Agents wanted.

DALTON KNITTING MACHINE CO.,

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HIGHEST PREMIUM

Shuttle Sewing Machine

Has only to be seen and operated to be Appreciated.

Call and see for yourself before purchasing. Please bring samples of various kinds of thread, (such as is usually found at stores,) and various kinds of fabric, which you know the former most popular Sewing Machines either cannot work at all, or, at best very imperfectly.

SUPERIORITY.

over any other Machine in the market will be seen at a glance.

1st It runs easily and rapidly, and is so constructed as to endure all kinds of hard usage.

2d. No breaking of threads in going over seams.

3d. No imperfect action of the feed at uneven places in the work.

4th. The Weed-stitch catches of itself, and will sew from the finest lace to the heaviest leather, and 200 cotton to coarse linen thread.

5th. The Weed Machine will do beautiful quilting on the bare wadding, without using inner lining; thus leaving it soft as if done by hand.

6th. The variety of fancy work that can be done on the

WEED MACHINE,

with so little trouble, makes it equal, if not superior, to six machines combined; for instance. it Binds, Hems, Tucks and Sews on the band at the same time, and in face, the

WEED NO. 2 MACHINE,

as before stated, is equivalent to a combination of any six ordinary machines.

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Below we give a few prices:

No. 2.	Oil Black Walnut, Ornamented with Hemmer.	$60,00
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No. 3.	Extra Oil-Polished Black Walnut, Half Case, Large Table beautifully Ornamented.	75,00

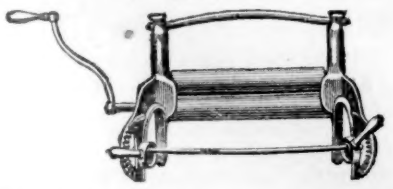
WEED SEWING MACHINE Co.,

186, 506 Broadway, New York

PUTNAM'S CLOTHES WRINGER.

IT IS THE ONLY RELIABLE

Self-Adjusting Wringer.



No Wood-work to Swell or Split. No Thumbscrews to get out of order. Warranted with or without Cog-wheels.

It took the First Premium at Fifty-seven State and County Fairs in 1863, and nearly double that number in 1864, and is, without an exception, the *best* Wringer ever made. Patented in the United States, England, Canada, and Australia. Agents wanted in every town, and in all parts of the world. Energetic agents can make from $3 to $10 per day

WHAT EVERYBODY KNOWS, VIZ.:

That Iron well galvanized *will not rust.*

That a *simple* machine is better than a complicated one.

That a Wringer should be *self-adjusting, durable, and effe ient.*

That thumb-screws and fastenings cause *delay* and *trouble* to regulate and keep in order.

That wood soaked in water will *swell, shrink,* and *split.*

That wood-bearings for the shaft to run in *will wear out.*

That the Putnam Wringer, with or without cog wheels, will *no tear the clothes.*

That cog-wheel regulators are not essential.

That the Putnam Wringer has *all* the advantages, and *not one* of the disadvantages above named.

That all who have tried it pronounce it the *best* Wringer ever made.

That it will wring a thread or a bed-quilt *without alteration.*

We might fill the paper with testimonials, but insert only a few to convince the skeptical, if such there be; and we say to all, *test* Putnam's Wringer. Test it *thoroughly* with *any* and any others, and if not entirely satisfactory, return it;

PUTNAM MANUFACTURING CO.—*Gentlemen:* I know from practical experience that iron well galvanized with zinc will not oxydize or rust one particle. The Putnam Wringer is as near perfect as possible, and I can cheerfully recommend it to be the best in use. Respectfully yours,

JOHN W. WHEELER, Cleveland, O.

Many years' experience in the galvanizing business enables me to indorse the above statement in *all particulars.*

JOHN C. LEFFERTS, No. 100 Beekman St.

NEW YORK, *January,* 1864.—We have tested Putnam's Clothes Wringer by practical working, and know that it will do. It is cheap; it is simple; it requires no room, whether at work or at rest; a child can operate it; it does its duty thoroughly; it saves time, and it saves wear and tear. We earnestly advise all who have *much* washing to do, with all intelligent persons who have *any,* to buy this Wringer. It will pay for itself in a year at most. HORACE GREELEY.

PRICES—$8, $9, and $10.

Sample Wringers sent, express paid, on receipt of price.

Manufactured and sold, wholesale and retail, by

PUTNAM MANUF'G CO.,

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BENNINGTON, Vt.,
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C. GEFRORER,

MANUFACTURER OF

Gas Heating Apparatus

OF EVERY DESCRIPTION,

Gas Burners, &c.

No. 529 COMMERCE STREET,

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Burners for Wood, Coal Oil and Water Gas.

Gas and Lava Burner Tips

Constantly on Hand

THE AMERICAN METER CO.

Organized under the General Manufacturing Laws of the State of New York

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THOMAS C. HOPPER, *Superintendent at Philadelphia.*

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS AND REGISTERS, SERVICE and METER COCKS, and all other articles in their line appertaining to the use of Gas-Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of workmanship. Orders addressed

AMERICAN METER COMPANY,

West Twenty Second Street, New York. Arch and Twenty-Second Streets, Philadelphia. No. 23 West Street, Boston will meet with prompt attention.

Harris & Brother, Practical Gas Meter Manufacturers,

Continue, as heretofore at their old Establishment, No. 1117 CHERRY ST., PHILADELPHIA, to Manufacture

WET AND DRY GAS METERS, and all kinds of GAS APPARATUS, and furnish all articles appertaining to the use of Gas Works. ☞OUR WORK WARRANTED—Satisfaction Guaranteed. Orders respectfully solicted, and promptly attended to, by

HARRIS & BRO., No 1117 Cherry st., Philadelphia.

Messrs. Harris & Brother, Philadelphia Gas Works, February 14, 1857.

Dear Sirs;—I take great pleasure in stating that we have found your meters to register with entire correctness, and to be generally of very good quality—the number furnished by you to these works is over 5,000.

John C. Cresson, Engineer;

Office of the Gas Light Company of Augusta, Ga., March 6th, 1858.

This is to certify that having used meters manufactured by Messrs. Harris & Bro., for the last nine years, we do not hesitate to state they have given entire satisfaction in point of wokmanship and accuracy of registration; they are surpassed by none, and equaled by few manufactories in the Union; we have used meters made by other establishments but our preference is in favor of those made by Harris & Bro., of Philadelphia, Pa.

G. S. Hookey, Superintendent of the Gas Light Company of Augusta, Georgia.

Messrs. Harris & Brother, Philadelphia. Philadelphia, March 4, 1858.

Gentlemen—We take great pleasure in bearing our testimony to the very superior character of the meters we have received from your establishment. We have always found the workmanship all we could desire, while the accuracy and reliability of their measurement have always been satisfactory. We have used meters made by other parties, and none have given as entire satisfaction as those received from you. We are, gentlemen, very truly, yours, Birkinbine & Mears.

Messrs. Harris & Brother. March 14, 1857.

Gentlemen—For the last ten years we have used in the Philadelphia Gas Works, meters made in your factory, and take pleasure in expressing my opinion to their correctness. On several occasions I have taken your meters apart, and found the material used in the manufacture of the same, to be as fine quality as is used in those imported from Europe, or made by any of the manufactur in the United States. Respectfully Yours George Wiegand, Inspector of Gas Fittings, Philadelphia

C. GEFRORER,

MANUFACTURER OF GAS BURNERS,

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Burners for Wood, Coal Oil, and Water Gas. Brass and Lava Burner Tips Constantly on Hand.

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499 BROADWAY, NEW YORK.

THE ATTENTION of the public and the trade is invited to our New Scale, Seven Octave, Rosewood Piano Fortes, which for volume and purity of tone are unrivalled by any that have hitherto offered in this market. They contain all the modern improvements, French Grand Action, Harp Pedal, Iron Frame, Over-strung Bass, etc., and each instrument, being made under the supervision of Mr. J. H. Grovesteen, who has had a practical experience of over thirty years in their manufacture, is fully warranted in every particular.

THE "GROVESTEEN PIANO-FORTE"
RECEIVED THE HIGHEST PREMIUM AT THE
CELEBRATED WORLD'S FAIR.

Where were exhibited instruments from the best makers of London, Paris, Germany, Philadelphia, Baltimore, Boston, and New York; and also at the American Institute for five successive years, the gold and silver medals from both of which can be seen at our warerooms.

By the introduction of improvement we make a still more perfect Piano-Forte, and by manufacturing largely, with a strictly cash system, are enabled to offer these instruments at a price which will preclude all competition.

PRICES

No. 1,	Seven Octave,	round	corners, Rosewood,	Plain Case, $275
No. 2,	"	"	"	Heavy Moulding 300
No. 3,	"	"	"	Louis XIV style 325

a fac-simile of the accompanying cut.

TERMS—Net Cash, in current funds Descriptive circular sent free on application.

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PASCAL IRON WORKS

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Manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues, GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast-Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal Gas-works,; Cast-Iron Street Mains, Bends, Branches, Drips, &c.

Gas and Steam Fitters' Tools, &c.

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MERRICK & SONS, Engineers,

MANUFACTURERS OF EVERY DESCRIPTION OF GAS MACHINERY.

Retorts, Bench Castings, Condensers, Washers, Scrubbers, Wet or Dry Lime Purifiers, Coke Wagons, Fire Tools, Wrought Iron Grate Bars, Gasholders, either Telescopic or Single, with Suspension Frames complete; Wrought Iron Roof Frames, for Iron or Slate; Stop Cocks, Exhausters, Steam Pumps, Boilers and Tanks, Steam or Hand Air Pumps for proving Street Mains, Centre Seals, Governors, Wrought or Cast-Iron, Line Sieves for Purifiers, Hoisting Machines for Lifting Purifier Covers.

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(Successors to Colwell & Co.)

Manufacturers of

PIG IRON & CAST IRON GAS & WATER PIPES.

Also, Heavy & Light Castings of every description, No. 207 North Water street and 206 North Wharves, Philadelphia.

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TO GAS COMPANIES.

THE UNDERSIGNED DESIRES TO undertake the supervision of several small Gas-works, to visit and examine them as often as may be necessary; to obtain and inspect their coal, castings, fire-brick, and other materials; and to manage their general business in such a manner that they shall be under such supervision as is now attainable in large works, at much increased cost. Also, to advise as general Consulting Engineer and expert in practical chemistry.

CHAS. M. CRESSON,
Late Asst. Engineer of the Philadelphia Gas-works
417 Walnut st., Philadelphia.

POOLE & HUNT,
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are prepared to execute orders for
GAS-HOLDERS,
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And other descriptions of
Iron Work for Gas-Works, Water-Pipes, and Heavy Castings, and Machinery generally.

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NEW PATENT
GAS APPARATUS
For Country Residences, Public Buildings, &c.,
FROM $300 UPWARDS.
EVERY DESCRIPTION OF GAS FIXTURES.
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SAFETY STEAM PUMP,

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1615, 1617, and 1619 Francis St.,
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MANUFACTURER OF
Wet and Dry Gas Meters,
STATION, SHOW, & EXPERIMENTAL METERS,
Photometers, Pressure Registers, Indicators, and Gauges, Governors, Meter Provers, Centre Seals, Fluid Gauges, &c.
GAS APPARATUS
Of the most reliable and approved construction manufactured and on hand at the
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D. PARRISH, Jr.,
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And Contractor for Coal or Oil Gas-Works.
Estimates given for Gas-Works, Gas-Holders, or any Gas Apparatus.
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To Manufacturers of Petroleum Gas.

For sale, Parrish's Patent Gas and Air Mixer, adapted to all works using Petroleum or other oils, by which rich Petroleum Gas is mixed, after it leaves the holder, with a proper proportion of air, giving it the greatest illuminating power, without smoke, through any burners. The apparatus being attached to the outlet pipe, requires no alteration of the works.

Apply at the Gas-Works of St. Nicholas Hotel, No. 63 Mercer st., N. Y., where one can be seen in operation; or address D. Parrish, Jr., St. Nicholas Hotel, New York city, or No. 1416 Arch street, Philadelphia.

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DAMPER REGULATORS.

Guaranteed to effect a great saving in fuel and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 117 Broadway, New York.

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Is now in use by many City Water Cos., because of its low price, simplicity, durability, accuracy under any pressure, and (a great advantage) because it runs with less head than any meter used. Manufactured by H. Q. HAWLEY, Albany, N. Y.

WEST'S IMPROVED PUMPS, the most Simple, Durable, and Powerful, and the Cheapest in use.

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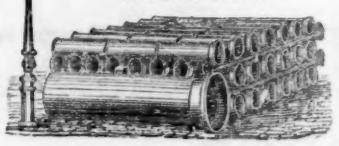

Great Improvement
IN
Sewing Machines.
EMPIRE
SHUTTLE MACHINE!

Patented February 14th, 1860.

Salesroom, 536 Broadway.

This Machine is constructed on entirely new principles of mechanism, possessing many rare and valuable improvements, having been examined by the most profound experts, and pronounced to be SIMPLICITY and PERFECTION COMBINED.

It has a straight needle, perpendicular action, makes the LOCK or SHUTTLE STITCH, which will NEITHER RIP nor RAVEL, and is alike on both sides; performs perfect sewing on every description of material, from Leather to the finest Nansook Muslin, with cotton, linen, or silk thread, from the corsest to the finest numbers.

Having neither CAM nor COG WHEEL, and the least possible friction, it runs as smooth as glass, and is

Emphatically a Noiseless Machine!

PRICE OF MACHINES,
COMPLETE:

No. 1, Family Machine, with Hemmer, Feller, Gauge, Braider, & Corder, complete. - - - $60
No. 2 Small Manufacturing, with Extension Table, $75
No. 3. Large Manufacturing, with Extension Table, $85
No 3. Large Manufacturing, for Leather, with Rolling Foot and Oil Cup, 100

One-half hour's instructions is sufficient to enable any person to work this Machine to their entire satisfaction.

Agents Wanted in all Towns in the United States, where Agents are not already established. Also, for Cuba, Mexico, Central and South America, to whom a liberal discount will be given Terms, invariably CASH on delivery.

T. J. McARTHUR & CO.,
536 Broadway.

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WIGHTMAN BROS.,
IMPORTERS AND
SOLE AGENTS
For the United States and Canada, of
SCHWARZ'S
GERMAN LAVA GAS-TIPS
And proprietors of Winchester's Improved
LAVA TIP GAS BURNERS,
No. 25 Kilby Street,
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T. G. ARNOLD,
MANUFACTURER OF
GAS-BURNERS,
And Importer of SCOTCH TIPS,
224 and 226 West 21st street,
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Mercury Cups, Portable Sockets, Burner Pillars, Burner Pliers, &c., &c.

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Manufacturer of
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For Lighting and Heating Purposes.
GAS HEATING AND COOKING APPARATUS; FITTERS' ROVING APPARATUS, &c.
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JOSEPH LEES,
Sole Agent for the sale of
Thompson's Gas Controller
In the States of
CALIFORNIA AND OREGON,
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Carrington & Co.'s
GENERAL
PURCHASING
AGENCY,
In Connection with all the Expresses
No. 30 Broadway,
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Established 1854.

Purchases to order any article wanted from New York, or Europe, for ladies' or gentlemen's use or wear,---comfort or luxury,---from a cameo to a cashmer, a seal ring to a steam engine.

Goods purchased at current City prices, and forwarded by Express or as directed.

Commission, Five Per Cent

Remittances, with orders, can be made by Express if preferred, as all Express Agents will take orders, receipt for and forward funds, and see to return of Goods.

THE HAVANA
MEXICAN & BRAZILIAN
EXPRESS.

CARRINGTON & CO.
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Express for HAVANA and ISLAND OF CUBA by regular steamships weekly.

Express for MEXICO and VERA CRUZ on the 10th and 16th of every month.

Express for ST. THOMAS, BAHIA, and RIO DE JANEIRO each month.

Packages received for United States Brazil Squadron.

Freights should be sent to our office day before sailing of steamer, with invoice, contents and value.

FINKLE & LYON'S
New Family
SEWING MACHINE
Should be known in
IN EVERY TOWN.

To accomplish this at once and save the expense of a *Travelling Agent*, we offer thus, viz:

Any one sending us orders for two machines shall receive one machine free of charge. This proposition cannot avail after we have appointed a local agent in the town.

We have now completed our *new manufacture* at a cost of some $200,000—introducing *new patents*, and such important improvements, that without fear we are able to offer the following stringent guarantee, viz: After a fair trial, if any purchaser does not prefer the FINKLE & LYON FAMILY SEWING MACHINE to any other, he can return it and have back his money.

This machine has taken many of the HIGHEST PRIZES; *is less complicated than any other first class machine; does a wider range of work without changing; requires no taking apart to clean or oil, no "lessons" to set needle, regulate tension or operate machine.*

Our new Manufacturing Machine is sold on the same terms as the Family Machine.

Please send for a circular with samples of sewing.

Finkle & Lyon S. M. Co.
No. 581 BROADWAY, NEW YORK.

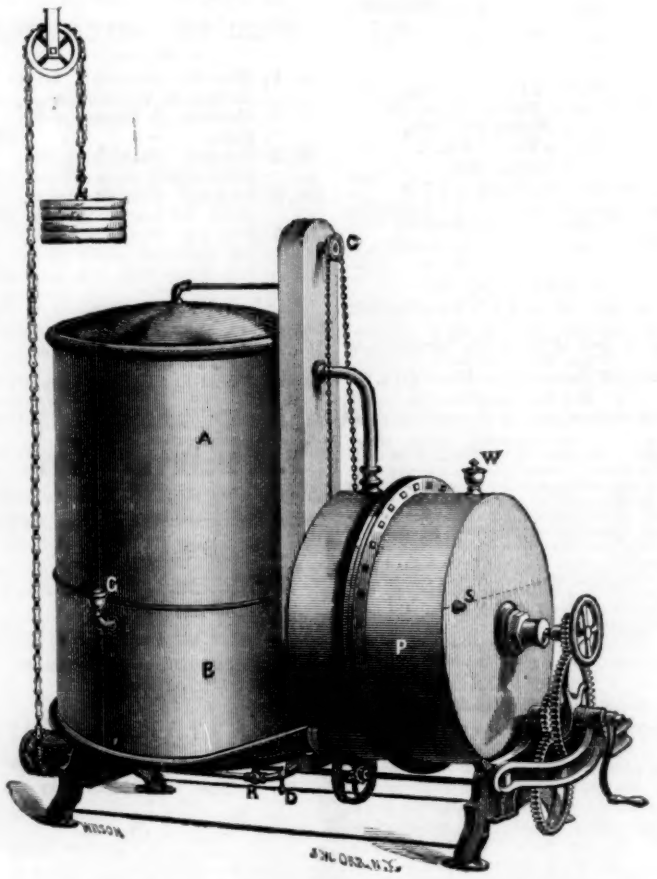
EMPIRE STATE GAS MACHINE,

LEVI STEVENS' PATENT, FOR SUPPLYING,

Dwellings. Stores, Factories and Public Buildings.

THE GAS GENERATED BY THIS MACHINE

Is a mixture of the vapor of hydro-carbon with common air. The mechanical devices employed are such as, from a long experience and critical examination into the nature of the element brought into use, seam best adapted to secure a certain and satisfactory result. GASOLINE, the liquid employed, is the more volatile portion of Petroleum, of a specific gravity of 0.6587. This liquid exposed to the action of this machine is vaporized, and a close mechanical mixture of the vapor with common air is effected. The value of the gas produced, its permanency, its illuminating quality, and freedom from liability to condensation, depend almost entirely upon the perfect and uniform character of this mixture. Hence the great importance of mechanical means adapted to secure all the conditions requisite in a Portable Gas Machine.



THE PRICE-LISTS OF MACHINES COMPLETE;

(Boxed and delivered on the cars at the Manufactory.)

No. 1,	$150,	5 Argand Burners.
do. 2,	250,	10 do.
do. 3,	350,	20 do.
do. 4,	450,	35 do.
do. 5,	600,	60 do.
do. 6,	1,000,	125 do.
do. 7,	1,500,	250 do.

This machine will produce the most brilliant and steady light without Fire or Heat, and is warranted to operate in every respect as represented.

The EMPIRE STATE GAS MACHINE is the most SIMPLE and EFFECTIVE MEANS KNOWN FOR PRODUCING GAS WITHOUT HEAT.

Its action is automatic, feeding itself with constant supplies of Gasoline, thus securing steady and uniform supplies of Gas. The gas produced is equal to the best known Illuminating Gas. It is as economical as any other, and is adapted to a wider range of use for Lighting, Heatin and Mechanical purposes. It will maintain its illuminating power under as great a degree of cold as any other. It is free from danger with the ordinary care in using gas. Its remarkably pure and steady light is pleasant for the eye. It renders it easy for persons living remote from street gas pipes to enjoy the luxury of a pure GAS-LIGHT, at a COMPARATIVELY SMALL COST, AND WITH LITTLE TROUBLE.

☞ The public are invited to witness its operations at our store. GASOLINE will be supplied by us, at market prices, or may be obtained from the various other sources of supply now going into operation.

MITCHELL, VANCE & Co., 620 Broadway, New York,

Manufacturers of Chandeliers and Gas Fixtures of every description. Also Chandeliers, Brackets, Lamps, &c., for Coal Oil, adapted to Churches, Public Buildings, Dwellings, &c.

MAY 25, 1867.